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Puhakka, Riikka

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Older consumers' perceptions of functional foods and non-edible health-enhancing innovations

Riikka Puhakka¹  | Raisa Valve² | Aki Sinkkonen¹

¹Department of Environmental Sciences, University of Helsinki, Lahti, Finland

²Department of Food and Environmental Sciences, University of Helsinki, Helsinki Finland

Correspondence

Department of Environmental Sciences, University of Helsinki, Niemenkatu 73, FI-15140 Lahti, Finland.
Email: riikka.puhakka@helsinki.fi

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Abstract

Increasing interest in health and well-being is likely to drive a growth in demand for products that have positive effects on health. Consumers' acceptance of and willingness to buy functional foods has been widely studied, but there has not been research on consumers' attitudes towards innovative non-edible products with health effects. This study examines how older consumers perceive functional foods and novel non-edible health-enhancing products, how willing they are to purchase such products, and how health orientation influences their views. As an example of a 'radical' innovation, consumers' acceptance of rubbing their hands in a specific soil-based mixture to modulate the immune system is explored. The research material, 13 thematic interviews, was collected in Lahti region, Finland, in 2015. The study indicates that the older consumers' market is not homogeneous. Based on a qualitative, in-depth approach, the study distinguishes four consumer segments with different lay understandings of health and attitudes towards health-enhancing products, which influence people's willingness to purchase such products. The segments are *health-seeking consumers*, *cautious consumers*, *critical consumers* and *natural health consumers*. Various motives and barriers for using products with health claims are also identified. The case of rubbing hands in organic soil-based mixture indicates the difficulty of predicting which consumer segment will first adopt this kind of 'radical' innovation. The results highlight that the credence qualities of a novel product must be communicated and advertised before entering the market while also taking into account the sensory properties of the product. 'Radical innovations' must be in a form that consumers can easily accept.

KEYWORDS

consumer behaviour, Finland, functional foods, health, radical innovation, segments

1 | INTRODUCTION

Ageing of the population is one of the megatrends which affects consumers' preferences and purchase behaviour in the future. People in industrial societies are not only living longer but they are also expected to be healthier, desire improved quality of their later years and are generally economically wealthier than the previous generations of older people (e.g., Yoon & Cole, 2008). Meanwhile, people feel increasing responsibility over maintaining their ability to function and are willing to invest in their well-being (e.g., Yeoman, 2012). Consumers have also turned their interests towards a more natural way of living (Kim & Seock, 2009), which is closely linked to perceived healthiness (Rozin et al., 2004). Yeoman (2012) has suggested that older consumers are searching for a means to extend healthy retirement years and this is

likely to drive a growth in demand for products that have positive effects on health. However, further research is needed to investigate the connection between ageing of the population and the market for health and well-being products. In addition, although the older consumers' market is increasingly important in terms of size, longevity of demand and willingness to spend, the market is not homogeneous. Segmentation is needed because people become more diverse with respect to lifestyles, needs and consumption habits as they age (Sudbury & Simcock, 2009; van der Zanden, van Kleef, de Wijk, & van Trijp, 2015; Yoon & Cole, 2008).

Consumer requirements are changing in the field of food production, for instance. Consumers increasingly believe that food contribute directly to their health and want to adopt health-oriented changes in their eating habits (e.g., Prättälä, 2003). Accordingly, functional foods

have entered the markets rapidly and gained market share as value added products in developed countries, including Finland (Menrad, 2003; Niva, 2006). Functional foods are generally defined as products that influence specific functions in the body and thus offer benefits for health, well-being and performance beyond their regular nutritional value (Diplock et al., 1999).

There has been little research specifically into older consumers' views and use of functional foods (e.g., Vella, Stratton, Sheeshka, & Duncan, 2013; van der Zanden, van Kleef, de Wijk, & van Trijp, 2014, 2015; Annunziata, Vecchio, & Kraus, 2015). Furthermore, there has not been research on consumers' attitudes towards innovative non-edible products with health effects. The idea of receiving health benefits by eating functional foods has become familiar with many consumers but, for example, what are consumer perceptions of health benefits obtained through skin, that is, by being in physical contact with a functional product? Modern technologies may allow for the altering of products in ways that provide additional health benefits to consumers, but so far the examples of such products are rare.

Consumers' attitudes towards health-enhancing products or health claims have been linked to willingness to use such products (Urala & Lähteenmäki, 2007). Therefore, the success of health innovations will depend on consumers' acceptance of the products as part of their daily lives (Siegrist, 2008). Consumer acceptance is particularly important in the case of 'radical' (or discontinuous, generational or breakthrough) product innovations (Dahlin & Behrens, 2005). 'Radical' innovations are new to their users or radical in terms of creating disruptions in users' existing usage patterns or requiring new consumption patterns. As 'radical' innovations by their very nature are dissimilar to existing products or services, consumer acceptance may be slower than for 'incremental' new products (Bogue, Sorenson, & O'Keeffe, 2009). Really radically innovative products are often discarded because consumers neither understand them nor appreciate their benefits (Heiskanen et al., 2007). To avoid market failures, consumers' attitudes should be taken into account at an early stage of product development (see van Kleef, van Trijp, & Luning, 2005a; Siegrist, 2008).

This article examines older consumers' perceptions and acceptance of functional foods and novel non-edible health-enhancing products, their willingness to purchase such products and the influence of health orientation in their views. The research material, 13 thematic interviews, was collected in Lahti region, Finland, in 2015. Based on a qualitative, in-depth approach, this study distinguishes four consumer segments with different lay understandings of health (see Niva, 2007; Popay & Williams, 1996) and attitudes towards health-enhancing products, which influence people's willingness to purchase such products. Various motives and barriers for using products with health claims are also identified. Functional foods are used as 'reference products' because of their similarity to other health-enhancing products. As an example of a 'radical' innovation, consumers' acceptance of rubbing their hands in an organic soil-based mixture to modulate the immune system is explored. Being in contact with nature has been shown to be linked to the composition of human commensal microbiota and its immunomodulatory capacity, and associated with a reduced risk of allergies and autoimmune diseases (e.g., Hanski et al., 2012). Based on

our research group's innovation, it is possible to separate the health benefits of a soil-based mixture from the risk of receiving a soil-borne pathogen (patent pending, application number 20165932). One potential way to offer this innovation to consumers is to prepare a product that looks and feels like a mixture of various organic soils.

2 | LITERATURE REVIEW

Functional foods have been developed almost in all food categories, particularly in the dairy-, confectionery, soft-drinks, bakery and baby-food market. Functional foods aim to improve the general conditions of the body (e.g., pre- and probiotics), decrease the risk of some diseases (e.g., cholesterol-lowering products), and could be used for curing some illnesses (Bigliardi & Galati, 2013; Menrad, 2003). Health claims are regulated at the EU level and allowed in food products if they are based on scientific evidence (see Lähteenmäki et al., 2010). In Finland, functional foods have been developed and actively discussed in public arenas since the 1990s. Compared to some other Western countries, the attitudes of Finns towards functional foods seem to be relatively positive (Bech-Larsen & Grunert, 2003; Niva, 2007; Urala, Arvola, & Lähteenmäki, 2003). This trusting stance may be due to familiarity with functional foods, absence of serious food scandals, the health-oriented Finnish culture, the generally high level of societal trust, and favourable public opinions on technological development in Finland (Niva & Mäkelä, 2007; Niva, 2007).

Many studies have reported that female consumers are the most likely users or buyers of functional foods (de Jong, Ocké, Branderhorst, & Friele, 2003; Niva, 2006; Siró, Kápolna, Kápolna, & Lugasi, 2008), partly because they show more interest in healthy food consumption and health in general (Bech-Larsen & Scholderer, 2007). However, other studies did not demonstrate major gender effects on consumer attitude towards functional foods (Peng, West, & Wang, 2006; Urala & Lähteenmäki, 2007; Verbeke, 2005). It has also been suggested that the effect of gender depends on the combination of product carrier, the considered nutrient, and the claimed health benefit (Ares & Gámbaro, 2007; van der Zanden et al., 2015; Verbeke, Scholderer, & Lähteenmäki, 2009).

According to some studies, middle-aged and older people tend to be substantially more health-oriented than younger consumers, which is usually mirrored by similar patterns in awareness of functional foods and intentions to buy them (Bech-Larsen & Grunert, 2003; Urala & Lähteenmäki, 2007; Verbeke, 2005). Middle-aged and older consumers, or people very close to them, are more likely to be diagnosed with the disease or nutrition problem, and thus they are more aware of health issues and able to evaluate specific functional claims and relate them to their personal health (Bech-Larsen & Scholderer, 2007). Consumers with family members suffering from a disease are more willing to accept the concept of functional foods (Landström, Koivisto Hursti, Becker, & Magnusson, 2007; Verbeke, 2005), but personal relevance seems to be an even stronger factor in willingness to use a product (Dean et al., 2012). Nevertheless, in some studies older people have been shown to be sceptical about functional foods (Niva & Mäkelä,

2007; van der Zanden et al., 2014) and considerably heterogeneous regarding the acceptance of functional foods (van der Zanden et al., 2015). Older and younger consumers may also have preferences towards the different types of functional foods and functionality-related benefits (Ares & Gámbaro, 2007; Niva, 2006).

Several studies have concluded that other factors, such as attitudes, knowledge, beliefs, and familiarity, rather than demographics explain the consumption of functional foods (Landström et al., 2007; Verbeke et al., 2009; Verbeke, 2005). Within consumer attitudes towards functional foods, dimensions relating to perceived reward (Urala & Lähteenmäki, 2007) or health benefit (Verbeke, 2005) have been found to be the strongest dimensions behind consumers' interest for a product. Positive attitudes, stronger beliefs and previous experience with the product category increase the likelihood of future purchase (Dean et al., 2012; Peng et al., 2006). Frequency of the functional foods' usage also affects the perceived benefit (Urala et al., 2003). Finally, consumers that see healthy eating important or have interest in health in general have been found to be more likely to use products with health claims (Dean et al., 2012; Landström et al., 2007; Niva, 2006).

Product-dependent differences are likely to influence the perceptions of functional foods. Consumers do not see functional foods as one homogenous group of products but rather perceive them as a member of the general product category (e.g., yoghurt) (de Jong et al., 2003; Urala & Lähteenmäki, 2007). Therefore, interest in one category of functional foods does not necessarily lead to interest in other categories (Peng et al., 2006). Ares and Gámbaro (2007) concluded that the carrier product's relation to the type of enrichment had the largest effect on consumers' perceived healthiness and willingness to try different functional foods. Siegrist, Stampfli, and Kastenholz (2008) also observed a significant interaction between benefit claim and carrier for willingness to buy, which suggests that consumers do not perceive health claims independently from the carrier. Health claims are more accepted on products that already are considered as having a healthy image (Bech-Larsen & Grunert, 2003; van Kleef, van Trijp, & Luning, 2005b).

Not only is consumer familiarity with the carrier important but so too is familiarity with the functional compound, health benefit, and health claims *per se*. Consumers are more likely to accept functional ingredients with a well-established and broadly appealing health image (such as calcium, vitamin C) than functional ingredients (such as selenium) which are unfamiliar or appeal only to consumers with rather advanced medical or nutrition knowledge (Bech-Larsen & Grunert, 2003; Lähteenmäki et al., 2010; Urala & Lähteenmäki, 2007). Therefore, the acceptance of a specific functional ingredient is linked to the consumer's knowledge of the health effects of ingredients (Siró et al., 2008).

Consumers tend to interpret naturalness *per se* in products as being good for them; they prefer natural options for ideational reasons rather than for any instrumental benefit (Rozin et al., 2004). Also in food products naturalness is a valued attribute and closely linked to perceived healthiness. Lähteenmäki et al. (2010) observed that health-related claims had the largest impact on perceived naturalness

suggesting that consumers perceived added functional components as unnatural. In addition, perceived changes in naturalness affected the attractiveness of functional foods. Because consumers may perceive functional enrichment as interfering with nature, cultural values pertaining to human manipulation of nature influence consumer acceptance of functional products (Bech-Larsen & Grunert, 2003; Frewer, Scholderer, & Lambert, 2003). The contradiction between 'natural' and 'technological' in functional foods opens up considerations of risks and safety, on one hand, and emphasis on regulation and control, on the other (Niva & Mäkelä, 2007). However, whether functional foods are perceived as natural or non-natural varies widely between countries and individuals and depend also on the type of ingredient and product (de Jong et al., 2003; Landström, Koivisto Hursti, & Magnusson, 2009; Urala & Lähteenmäki, 2007).

Very few consumers are willing to buy functional foods which are inferior in taste to their nonfunctional counterparts (Urala & Lähteenmäki, 2007; Vella et al., 2013; Verbeke, 2005). Functional benefits may provide added value to consumers but cannot outweigh the sensory properties of foods (Bech-Larsen & Scholderer, 2007). Therefore, an effective scientific research itself does not make a product successful in the market, but the product should be in a form that the consumers could easily accept (Siró et al., 2008; van Kleef et al., 2005b).

Accordingly, the role of communicating with and educating consumers is crucial because they cannot experience directly the health benefits of functional products. Health-related qualities are credence characteristics, which means that consumers do not usually or immediately feel healthier because they have eaten or touched a product that is supposed to be good for their health. Furthermore, health effects are often quite abstract, for instance decreased risk of certain types of diseases. The average consumers cannot ascertain the quality of these credence dimensions themselves but are forced to believe in the arguments provided by the industry. As a result, trust becomes an important factor for the acceptance of health-enhancing products (Grunert, 2002; Peng et al., 2006; Siegrist et al., 2008; Siegrist, 2008). For instance, Verbeke (2005) observed that belief in the health benefits was the main positive determinant of accepting functional foods. Credence qualities are prone to generate perceived risk and uncertainty, especially when information is inconsistent and trust in authorities is low (Dolgoplova, Teuber, & Bruschi, 2015; Ronteltap, van Trijp, Renes, & Frewer, 2007).

Suspicious attitudes, perceived risks, doubts and scepticism have been identified as relevant factors influencing consumer attitudes towards functional foods (Frewer et al., 2003; Landström et al., 2009; Niva, 2007). Verbeke et al. (2009) observed that perceiving functional foods as a marketing scam decreased intention to use products with health claims. Other barriers for using functional products are the lack of interest or knowledge, risk of adverse effects, high cost, reluctance to change habits and the perception that there is no need for such foods (Niva, 2006; Urala & Lähteenmäki, 2007; van der Zanden et al., 2014; Vella et al., 2013). In this article, the various barriers and motives for using functional foods and novel non-edible health-enhancing products are identified, and there is an examination of how older consumers

perceive health-enhancing products, how willing they are to purchase such products, and how health orientation influences their views.

3 | METHODS

In this study, a qualitative approach was used to examine older consumers' perspectives on functional foods and innovative non-edible products with health effects. Qualitative methods play an important role when user needs are investigated, in particular when the aim is to gain a deeper understanding of needs, attitudes or emotions (Grunert et al., 2008). In-depth interviews are especially valuable at the earliest stages of the product development process where consumers' needs and purchase motivations may be poorly understood (see Bogue et al., 2009).

A purposive sampling approach was used in this study. The research material included 13 interviews which were conducted in Lahti region, southern Finland, with over 200,000 inhabitants. All interviewees participated in ADELE (Autoimmune defense and living environment, 2015–2016) study which included data collection on the health and living environment of 60 elderly persons from urban and rural areas. Permission for the study was requested from the ethical committee of Tampere University Hospital, and the study participants signed a consent form. When they were contacted by telephone for the first time, their willingness to participate in the interview related to the research theme was sought. After eight persons had refused, a varied group of interviewees was selected. To map different perspectives on health innovations, both women and men representing two birth cohorts and living in urban and rural areas were invited to the interviews. Interviewing was not continued after conducting 13 interviews as data saturation was achieved.

The interviews were conducted face to face at interviewees' homes, and they lasted from 15 minutes to 1 hr. Interviewees included ten women and three men; nine of them were 65–69 years old and four were 75–79 years old. Seven interviewees lived in apartments in the city of Lahti and six in detached houses in the surrounding countryside. The interviewees were presumably more health oriented than the average Finnish person since apart from ADELE study they had actively participated in a large cohort study GOAL (Good Ageing in Lahti region, 2002–2012) (Fogelholm et al., 2006).

Thematic interviews covered four broad themes, which included more detailed questions about older people's views of products with health effects: (a) health orientation (e.g., 'How well are you aware of health issues, especially the function of the immune system?' 'How concerned are you about your own health?' 'Do you think it is possible to affect your health?'), (b) knowledge of and willingness to purchase functional foods (e.g., 'Do you buy functional foods?' 'Do you think such foods are beneficial to your health?'), (c) interest towards and willingness to purchase non-edible health-enhancing products (e.g., 'Do you think it is possible to develop other products with health effects?' 'Would you be willing to try innovative products such as rubbing your hands in organic soil?') and (d) nature relationship (e.g., 'What is your relationship with nature?' 'Do you believe that contact with nature can prevent allergies and autoimmune diseases?'). In case the concept of

functional foods was not familiar for the interviewees, they were given examples of real products to avoid misunderstandings. In terms of the 'radical' innovation, no details of the content of the material or other characteristics were given, but the first reactions to the idea of rubbing hands in organic soil were examined. In our example of innovative health-enhancing product concepts of 'natural' and 'technological' are intertwined since this novel mixture is based on natural ingredients but involves technological processing and commercialization.

The interviews were recorded, transcribed (verbatim) and were content analysed (see Silverman, 2001). Data were reduced by 'coding' it (i.e., condensing into shorter texts while the meaning was preserved) and collected in one table to facilitate comparison and obtain a higher level of abstraction. By looking for repeated themes in the interviews, older consumers were divided into four groups, that is, segments, on the basis of their attitudes towards health-enhancing products. The aim of the segmentation was to cover the whole variety of health-related consumer views and purchase behaviours. Although these consumer segments are described as four separate groups, they may overlap and thus represent different shades or degrees of health consumers (see Swarbrooke & Horner, 2007). Individual interviewees may not solely represent one segment. This grouping summarises and generalises the interview responses; the groups were formed on the basis of the themes which appeared in all or most of the responses. The following section presents the main ideas of each consumer segment illustrated by interview quotations. The interviewer's questions and the interviewees' responses have been translated from Finnish to English by the first author.

4 | RESULTS

4.1 | Health-seeking consumers

The *health-seeking consumer* -segment is the most willing to purchase functional foods and other products with health effects (Figure 1). These consumers are health oriented and conscious of health issues as they are readers of health-related books and articles or watch TV programs on health issues, for instance. This does not, however, automatically mean that they have comprehensive knowledge of factors that affect health; they may not know the function of the human immune system in detail or the role of microbial exposure in preventing allergies and autoimmune diseases. These consumers are somewhat concerned

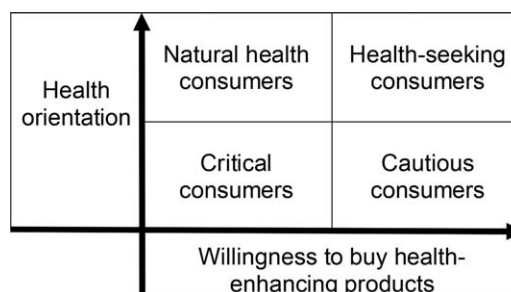


FIGURE 1 The four consumer segments identified based on the interviews

about their own health and believe that it is possible, at least to some extent, to influence one's own health with a healthy lifestyle and diet.

Do you believe it is possible to affect your own health? Yes, I believe so, just by checking what you put into your mouth and also in all other ways, by physical exercise. So I think it's quite important part of life (Female, 76 years old).

Health-seeking consumers are familiar with functional foods, although none of the interviewees knew comprehensively all functional products in the Finnish market. For instance, these consumers may use margarine containing plant stanol ester to lower their cholesterol level or products comprising lactic acid bacterium to calm down a stressed stomach; there are well-known brands of both product types in Finland. This segment generally has a positive attitude towards functional foods, and they believe that such foods are beneficial and safe for people.

Health-seeking consumers believe that it is possible to develop non-edible health-enhancing products with the help of modern science and technology; they do not worry that such products are a marketing scam. These consumers are willing to try different kinds of products if they feel the need for them, but they can also assess functional products critically. Other qualities than health effects, such as taste, may be more important for them when purchasing products. However, the price is not crucial since they may be willing to pay a higher price for health-enhancing products of good quality.

What if a product which enhances immunology is more expensive than a normal one? I think it really does not matter. It matters if it is beneficial for the health (Male, 67 years old).

This segment's attitude towards the 'radical' health innovation presented in this study, rubbing hands in organic soil-based mixture, is more complicated and intertwined with their relationship with nature. On one hand, some interviewees are willing to try this innovation and even to buy specific soil-like mixture for this purpose. On the other hand, some interviewees strongly connect cleanliness to health and dirtiness to diseases (see Speltini & Passini, 2014). Thus, they do not want dirt on their hands—they do not believe in the health benefits or they consider the aspects of risks and safety. Meanwhile, some interviewees remember that hygiene levels were lower in their childhood and that there were less allergies and autoimmune diseases than nowadays. Although they have the lay understanding of the connection between these issues, touching organic soil turned out to be too 'radical'—strange and even disgusting—for some of them. Cosmetic products such as mud baths or masks were more acceptable for some consumers.

4.2 | Cautious consumers

The second segment of the older consumers, called as *cautious consumers*, is critical towards health-enhancing products, but still willing to try or purchase certain products. These consumers are interested in and aware of health issues and their own health, but less so than the first segment of *health-seeking consumers*. For instance, while the first segment follows health related news and articles from the media regularly, these consumers follow them more irregularly. Accordingly, this

segment is not well aware of the function of the immune system or factors that affect it. They are not highly concerned about their own health and are less convinced than *health-seeking consumers* of the possibilities to influence one's own health as our genes also play a significant part in our health.

Are you concerned about your own health? No, I don't think much about that as I've been as healthy as I am... and it comes if it comes, disease, you can't do anything about it.

Do you think it is possible to affect your own health? Of course, at least when you have that kind of a job, for instance dust problems or something like that, and also noise problems, you should protect yourself. When I was in danger of farmer's lung... thereafter I have been more careful that I protect myself from dust, that I always wear a mask (Male, 75 years old).

Cautious consumers are somewhat critical towards functional foods and non-edible health-enhancing products since they are not convinced of all promises of the advertisers or industry. Despite the critical attitude, these consumers use some functional foods such as margarine containing plant stanol ester. Their acceptance varies with the type of a product considered; they are interested in specific functional properties of the products rather than functional foods as a whole. They may also use functional products just out of a habit—even though they are not totally convinced of their benefits. Therefore, this segment's attitude towards functional foods is not very consistent but rather ambivalent.

Do you believe that Benecol, for instance, helps; does it have the effects that it promises? I really can't say, but that's what we have... it has become a habit that we have always eaten it. I have never eaten Flora or something like that. We have liked Benecol since the beginning. I don't know if it has helped (Male, 76 years old).

Accordingly, *cautious consumers* have an ambivalent attitude towards innovative non-edible products with health-effects. On one hand, they may be suspicious towards the health claims; on the other hand, they may be willing to try or even purchase some novel health-enhancing products. Clearly, they have difficulties in giving an opinion about innovative products which do not exist at the moment.

Similar to *health-seeking consumers*, *cautious consumers'* perceptions of a 'radical' health innovation, rubbing hands in soil-based mixture, are divided and intertwined with their relationship with nature. For instance, some rural people have lay understanding of the connection between the living environment and health since they relate lower hygiene levels in their childhood to lower levels of allergies and autoimmune diseases. Therefore, this kind of innovation was more familiar and acceptable for them than for some urban interviewees.

4.3 | Critical consumers

This segment of older consumers, called as *critical consumers*, is the most suspicious towards functional foods and novel non-edible health-enhancing products. Also these consumers' interest towards their own health and health in general has increased as they have aged, but they are less health oriented and conscious of health issues than the first segment of *health-seeking consumers*. *Critical consumers'* concern over

their own health and the idea of the possibilities to influence it can be compared to *cautious consumers'* understandings.

Critical consumers have serious doubts about the claimed health benefits of functional foods. They rather think that these products are pure humbug; manufacturers and advertisers are just deluding consumers into buying various products by claiming them to have effects which do not appear after consumption. These consumers do not trust the manufacturers, feel any specific need for functional foods, or may even have negative personal experiences of such foods. Therefore, they do not choose food products on the basis of their health claims.

So you don't use any Benecol products in addition [to medication]?

Well, formerly there were those... was it before our cholesterol was observed... we thought that we eat that kind of, was it Becel, something that is rather expensive. We ate it for several years but it didn't have any effects. At least not for me (Female, 67 years old).

Similarly, *critical consumers* are sceptic towards innovative non-edible products with health claims and the least willing consumer segment to pay a higher price for health-enhancing products. Some interviewees associated all health-enhancing products with natural health products towards which they had a very critical attitude. However, the critical view does not automatically mean that these consumers would not be ready to try novel products. For instance, personal experience of the benefits may convince them of the usefulness of innovative products.

What if moisturizer would enhance immunology? Hmm...

I don't believe in that. They promise everything that you'll become young and beautiful, but we all get older so it doesn't... those advertisers just make up these claims. And you can see that we women get tricked much more, we believe in all these, few men eat natural products... and all these beauty lotions and all, they are meant for women, women get into them easier than men (Female, 66 years old).

This segment is also characterized by a rather ambivalent attitude towards the 'radical' innovation of rubbing hands in organic soil-based mixture. *Critical consumers* are not unambiguously the most critical towards this innovation since they may also have lay understanding of the role of the living environment in preventing allergies and autoimmune diseases, which influences the acceptance of this innovation.

4.4 | Natural health consumers

The fourth consumer segment, called as *natural health consumers*, values naturalness and believes in natural ways of maintaining health. These consumers are highly interested in health issues and their own health, and they actively follow health related news from the media. Similar to *health-seeking consumers*, they believe that it is possible to affect one's own health by following healthy lifestyle and diet. However, *natural health consumers* link naturalness with healthiness closely; they do not prefer medicine but rather use herbal medicine and other natural products. For instance, one interviewee told that she rather used cabbage leaves than medical ointment for her swollen legs.

Natural health consumers are not particularly interested in functional foods developed with the methods of modern science and technology. They do not feel any specific need for them or do not believe

in their benefits. In addition, these consumers may think that we should be able to feel what nutrients our bodies require and eat accordingly. They may perceive added functional components as unnatural and exclude processed and designed products from the conception of healthy foods. They emphasize the holistic approach to eating; they rather eat natural food which contain a lot of vitamins and other healthy ingredients. Therefore, qualities such as naturalness, taste, or domestic origin are more important for this segment than functional properties when choosing products.

Why do you not use functional foods; have you ever considered? No

I haven't considered, not even considered, because we have regular oatmeal and buckthorns and blueberries and lingonberries. I trust them more (Female, 68 years old).

Accordingly, *natural health consumers* are more interested in natural health products than non-edible health innovations based on modern science and technology; they interpret naturalness in products as being good for them. These consumers may also have doubts about the benefits of modern innovations. As regards to our example of a 'radical' innovation, rubbing hands in soil-based mixture, naturalness is entwined with technological manufacturing and commercialization processes. Although *natural health consumers* may realize the benefits of this kind of exposure to natural materials, they do not necessarily feel the need to use or buy specific products prepared for this purpose. Cultural values pertaining to man's manipulation of nature may also influence consumer acceptance. Furthermore, although considerations of risks and safety of natural materials are not the primary concern for these consumers, this kind of usage may be too unfamiliar even for them.

How does it sound to 'wash' hands with organic soil before eating, to enhance immunology? Well,

I have my hands in soil almost all the time. When I go to the greenhouse, I either plant a seedling or weed. I have soil under my nails almost always so I'm exposed enough... to that vaccination (Female, 79 years old).

5 | DISCUSSION

This study shows that older consumers' interest in health issues and need for health-enhancing products has grown as they have aged. The study indicates the similarities between the consumers of functional foods and those interested in novel non-edible health-enhancing products. The results highlight the role of personal relevance—the need to improve health—in promoting the willingness to use functional products (see Dean et al., 2012). People are generally reluctant to take preventive actions in order to improve their health as long as they feel healthy (Frewer et al., 2003; van der Zanden et al., 2014) or consider themselves as having a good enough diet and lifestyle (Landström et al., 2009). Interest in health in general does not necessarily increase the willingness to use products with health claims (cf. Landström et al., 2007). In particular, the segment of *natural health seekers* stresses the importance of naturalness in choosing food and other products (see Rozin et al., 2004) and may think that functional components or processed products are not natural.

TABLE 1 The older interviewees' motives and barriers for using health-enhancing products

Motives	Barriers
<ul style="list-style-type: none"> • Need to take preventive actions to improve health • Belief in the health benefits <ul style="list-style-type: none"> • Trust in science, technology, marketing • Willingness to try various products • Habit • Giving status 	<ul style="list-style-type: none"> • No need: no specific health problems • Disbelief in the health benefits <ul style="list-style-type: none"> • Lack of trust in science, technology, marketing • Unfamiliar usage patterns • Unpleasant sensory properties of the product • Perceived risks; contradiction with lay understanding of health • Lack of knowledge • High price

Accordingly, this study confirms that the older consumers' market is not homogenous. Consumers have different perspectives on and attitudes towards health-enhancing innovations (see van der Zanden et al., 2015); *health-seeking consumers* can be compared to 'early adopters' or 'innovators' and *critical consumers* to 'laggards' (see Rogers, 2003). Resisting innovation is not something particular to older consumers, but they may be willing to spend money on innovative products that meet their needs and wants (Leek, Szmigin, & Carrigan, 2001).

The older consumers' perceptions of both existing functional foods and ideas of non-edible health innovations demonstrate that the acceptance of health-enhancing products is not unconditional, varying with the type of product considered, as Peng et al. (2006) have indicated. This is particularly evident in the segment of *cautious consumers* who have the most ambivalent attitude towards functional products. Even those interviewees who were critical towards functional foods in general might still use cholesterol-lowering spreads themselves, for instance. Cholesterol-lowering products are not only favoured by the most health-oriented consumers, but they seem to have an established position on the Finnish market (see Niva, 2007; Urala and Lähteenmäki, 2007).

In line with the previous studies on functional foods (e.g., Landström et al., 2007; Verbeke et al., 2009), this study suggests that attitudes, knowledge and beliefs explain the consumption of health-enhancing products. Perceived or expected health benefits and risks are important factors for the acceptance of innovative products (Siegrist, 2008). Positive attitudes and beliefs in the health effects promote the willingness to use health-enhancing products (Table 1). In addition, some consumers are willing to try different kinds of products, even to raise their status, while others use some products just for the sake of a habit. Familiarity is crucial (see Lähteenmäki et al., 2010; Dean et al., 2012); consumers already familiar with and attracted by functional properties of foods are the most interested in new non-edible health-enhancing products. However, the idea of receiving health benefits by touching a functional product seems to be more suspicious for consumers than edible products—although most consumers are familiar with medical ointments or cosmetic creams. Furthermore, our example of a 'radical' innovation, rubbing hands in specific soil-based mixture, contains components not usually included in functional products or marketed with health-related arguments and it is based on an unfamiliar way of using natural material.

As health-related qualities of products are credence characteristics which consumers cannot experience directly, trust is an important

factor for the acceptance of novel non-edible health-enhancing products (see Dolgoplova et al., 2015; Grunert, 2002; Siegrist, 2008). Lack of trust can become a barrier for using health-enhancing products (Table 1). While in our study *critical consumers* are the most suspicious towards health claims provided by the manufacturers or advertisers, none of these Finnish interviewees were fully critical or expressed a total lack of trust. This may be influenced by a trusting position on functional foods and favourable opinions on technological development in Finland (see Niva, 2007; Niva & Mäkelä, 2007).

In terms of credence qualities, rubbing hands in organic soil-based mixture is somewhat different innovation than functional foods or certain products (e.g., ointments) in which the effective components are impossible to observe. Although consumers will not likely feel healthier after touching soil mixture, their lay understanding of the connection between health (i.e., allergies and autoimmune diseases) and contact with nature may justify the usage of this innovation. For instance, some older rural interviewees had this kind of understanding, they were familiar with touching natural materials, and thus this 'radical' innovation was acceptable for these consumers who otherwise may not be the early adopters of innovations. Meanwhile, some other interviewees who associated dirtiness to diseases did not understand or accept this kind of innovation (see Speltini & Passini, 2014). Therefore, the carrier product affects consumers' perceived healthiness and willingness to try functional products (see Ares & Gámbaro, 2007; Siegrist et al., 2008).

Furthermore, this study demonstrates the importance of the form of a novel innovation (see Siró et al., 2008). Taste seems to be the most important sensory property of functional foods (Urala & Lähteenmäki, 2007; Verbeke, 2005), but sensory appeal is also important for non-edible health-enhancing products. Scientific evidence of the benefits and consumers' need to improve health are not enough to attract consumers if the new consumption patterns raise feelings of disgust or fear, for instance. Although consumers usually interpret naturalness *per se* in products as being good for them and strongly link it with healthiness (Rozin et al., 2004), the 'radical' innovation of touching soil-based mixture may be too close to 'real' nature. For instance, some interviewees were disgusted by small bugs or worms in the soil or afraid of associated health risks. Since particularly women are often familiar with cosmetic products such as mud baths or peat masks, these kinds of products are likely more acceptable for suspicious consumers than a totally novel way of using natural material.

As with the results of research on functional foods, suspicious attitudes, perceived risks, doubts and scepticism are relevant barriers for using innovative non-edible products with health effects (e.g., Landström et al., 2009; Vella et al., 2013). The study indicates that older consumers would become motivated to use health-enhancing products if they would feel the need for functional products, perceive the health benefits themselves or people close to them or health professionals would recommend these kinds of products. On the basis of this study, reasonable price, knowledge of functional products, and scientific evidence of the benefits are also identified as facilitators that could help consumers to overcome the barriers.

6 | CONCLUSIONS

This qualitative study explored older consumers' perceptions and acceptance of functional foods and novel non-edible health-enhancing products. Four consumer segments were distinguished: *health-seeking consumers*, *cautious consumers*, *critical consumers* and *natural health consumers*. As consumers' attitudes affect the purchasing intention of different functional products differently, functional products cannot be seen as one homogenous group, but consumers' views should be examined also separately. The case of rubbing hands in organic soil-based mixture indicated that the adoption processes of these kinds of 'radical' innovations are not straightforward; consumers' acceptance is influenced by lay understandings of health, relationships with nature and living experience, for instance. The study aimed to map different patterns of awareness and acceptability, but it also showed the difficulty of predicting which consumer segment will first adopt this kind of innovation. Furthermore, the study produced valuable information of the consumer preferences related to the acceptable form of a 'radical' innovation. The results highlight that the credence qualities of a novel product must be communicated and advertised before entering the market while also taking into account the sensory properties of the product.

Limitations of this study are related to the sample size, and the interviewees' lack of knowledge of the functional products or the function of the immune system. Especially the interviewees had difficulties in giving an opinion of non-edible health innovations which do not exist at the moment. Some interviewees' responses were even contradictory, which illustrates that their expressions of preference were constructed when they were asked to give a judgement and may change by the time the product will be introduced (see Grunert et al., 2008; van Kleef et al., 2005a). Also in terms of existing functional foods, attitudes may not yet be strongly established in consumers' minds. These limitations indicate the benefits of conducting qualitative study at the early stages of the product development process; uncertainties among consumers should be taken into account in any consumer study. Meanwhile, future consumer studies related to novel ways to modulate immune system function or produce other health benefits should preferably recruit a larger sample. These older consumers' growing interest in health issues and health-enhancing products hints at the importance of the older segment for the health market, but further quantitative

research is needed to investigate the impact of the ageing of the population on the market for versatile health and well-being products.

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ORCID

Riikka Puhakka  <http://orcid.org/0000-0001-6546-0444>

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